

INFORMATION HANDOUT

TABLE OF CONTENTS

PROJECT:
CONTRACT NO.: 04-1123K1

SUBMITTAL TYPE:	PS&E (to District)	EXPEDITE (to HQOE with copy to District)	POST EXPEDITE (to HQOE with copy to District)
SUBMITTAL DATE:	<u>4/23/2004</u>	<u>9/1/2004</u>	

Contents	Bridge Number(s)
Foundation Recommendations	<u>35-0331 R/L</u>
Foundation Reviews	<u>35-0331 R/L</u>
Materials Reports	N/A
Pile Indicator Test Reports	N/A
Driveability Analysis	N/A
As Built Log of Test Borings (not in the contract plans)	N/A
As Built Pile Driving Records	N/A
<u>Devil's Slide Bridge, Design Criteria</u>	<u>35-0331 R/L</u>


Memorandum

*Flex your power!
Be energy efficient!*

To: MR. KEVIN HARPER
Division of Structures
Structure Design 1

Date: January 12, 2004

File: 04-SM-1
04-112371
Devil's Slide Bridge
Bridge 35-0331R/L

From: JOHN BOWMAN 
Associate Engineering Geologist
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Foundation Recommendations

A foundation investigation was completed at the site in August 2002. Five rotary sample borings and numerous 25 mm soil tubes borings were completed. Data are shown on the Log of Test Borings, which will be forwarded when completed.

GEOLOGY

Foundation materials at the site consist of marine sedimentary rocks of probable Cretaceous age. Rocks range from shales and siltstones at Bents 2, 3 and Abutment 4, to sandstone and conglomerate at Abutment 1. Surficial landsliding has occurred at Abutment 1, and also at Bent 2, left. Rock bedding attitudes vary by location. Beds exposed in the roadcut near Abutment 4 dip shallowly to the north, Rocks at Abutment 1 dip steeply to the west. Rocks encountered in the boring at Bent 2L had vertical dips, those encountered at Bent 3L had moderate dips (30 - 60 degrees).

Groundwater levels are variable. In August 2003, the groundwater surface was at elevation +86 m (15 m below the dirt road) at Abutment 1-R, elevation +76.9 (4.5 m below the ground surface) at Bent 2-L, and elevation + 67.6 (4.3 m bgs) at Bent 3-R. Groundwater measurements taken between August 2002 and August 2003 show the depth to the groundwater surface may vary by as much as a meter.

The site is not corrosive.

FOUNDATION RECOMMENDATIONS

The following recommendations are based on the General Plan dated October 14, 2003 and the Foundation Plan dated December 31, 2003 (Nos. 1 and 3), and dated November 12, 2003 and annotated January 8, 2003 by Kevin Harper (No. 2). The bridges may be supported by Spread footings at Abutments 1L, 4 R and 4L, large diameter CIDH pile groups at the Bents, and due to unfavorable bedrock orientations, by 600 mm CIDH piles at Abutment 1R and for the turnaround structure.

Bridge Recommendations

Spread footings are recommended at Abutment 4 R/L and Abutment 1L. Allowable bearing capacity is 480 kPa at Abutment 4 R/L, and 450 kPa at Abutment 1L. Ultimate bearing capacity is at least three times the allowable.

CIDH pile data for the Bents are shown in Table 1, CIDH pile data for the Abutments are in Table 2.

Table 1. 1.5 m CIDH piles.

Location	Nominal Compressive Load (kN)	Nominal Tension Load (kN)	Pile Cap Elevation (m)(2)	Design Tip Elevation (m) (1)	Specified Tip Elevation (m)
Bent 2 L	31500	11800	+72.0	+60.0/67.0	+60.0
Bent 2 R	31500	11800	+69.5	+57.5/64.5	+57.5
Bent 3 L	31500	11800	+61.5	+49.5/56.5	+49.5
Bent 3 R	36000	14950	+60.5	+46.0/54.5	+46.0

NOTES

- (1) Compression tip / tension tip
- (2) Bottom of pile cap to be at or below this elevation.

Table 2. Abutment 1 R, 600 mm CIDH piles.

Location	Design Load (kN)	Nominal Load (kN)	Pile Cap Elevation (m)(2)	Design Tip Elevation (m) (1)	Specified Tip Elevation (m)
Abut 1 R	400	800	+96.2	+91.2	+91.2
Abut 1 R ww	400	800	+97.6	+92.6	+92.6
Abut 1 R ww	400	800	+98.8	+93.8	+93.8
Abut 1 R ww	400	800	+100.2	+95.2	+95.2

NOTES

- (1) Compression tip, no tensile demands
(2) Bottom of pile cap to be at or below this elevation.

Turnaround Structure Recommendations

Due to the unfavorable dip of the underlying rock, CIDH pile foundations are recommended for the turnaround structure. The recommendations shown in Table 3 are for 600 mm CIDH piles, and provide options for either 625 kN or 900 kN design load piles.

Table 3. Turnaround Structure, 600 mm CIDH piles.

Location (approximate) Sta. RW LOL	Design Load (kN)	Nominal Load (kN)	Pile Cap Elevation (m)(2)	Design Tip Elevation (m) (1)	Specified Tip Elevation (m)
0+00 - 5+00	625 / 900	1250 / 1800	+98.5	+91.5/89.5	+91.5/89.5
5+00 - 10+00	625 / 900	1250 / 1800	+99.5	+92.5/90.5	+92.5/90.5
10+00 - 14+00	625 / 900	1250 / 1800	+98.5	+91.5/89.5	+91.5/89.5
14+00 - 25+00	625 / 900	1250 / 1800	+97.5	+90.5/88.5	+90.5/88.5
15+00 - 30+00	625 / 900	1250 / 1800	+97.0	+90.0/88.0	+90.0/88.0

MR. KEVIN HARPER
January 12, 2004
Page 4

Devil's Slide Bridge L/R
Br: 35-0331

NOTES

(1) Compression tip, no tensile demands. First number is for Class 625, the second is for Class 900 piles.

(2) Bottom of pile cap to be at or below this elevation.

Tiedowns are required for the turnaround structure near Abutment 1 L. The minimum tiedown unbonded length should be 5 m.

CONSTRUCTION CONSIDERATIONS

CIDH Piles

Groundwater will be encountered in the construction of the Bent footings and CIDH piles.

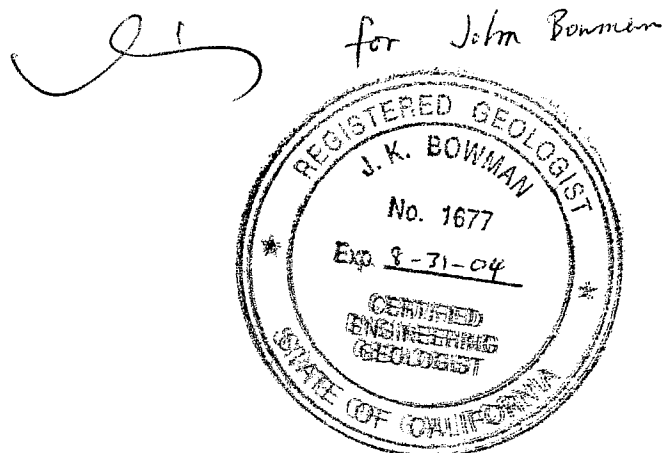
Difficult pile installation is expected due to the presence of groundwater and steeply dipping rocks that vary in hardness from very soft to very hard. The steep dips of some of the beds will make drilling and maintaining a vertical hole difficult.

CIDH construction will require wet methods of installation at the Bents, and possibly at Abutment 1.

If there are any questions, please contact John Bowman at (916) 227-7010.

c: District 4 (2)
R.E. Pending File- Struct. Construction
Project Management
QHuang - OGDW
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JBowman/mm



Memorandum

*Flex your power!
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To: MR. KEVIN HARPER
Division of Structures
Structure Design 1

Date: March 10, 2004

File: 04-SM-1
04-112371
Devil's Slide Bridge
Bridge 35-0331R/L

From: MARTHA MERRIAM *mm*
Associate Engineering Geologist
Office of Geotechnical Design - West
Geotechnical Services
Division of Engineering Services

JOHN BOWMAN
Associate Engineering Geologist
Office of Geotechnical Design - West
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Subject: Foundation Recommendations for Retaining Wall Near Abutment 1R

These recommendations are based on the Log of Test Borings dated October 24, 2003, a foundation report for the bridge dated January 12, 2004, and a site visit on March 4, 2004.

GEOLOGY

Foundation materials at the retaining wall site consist of marine sedimentary rocks (sandstone and conglomerate) of probable Cretaceous age. Surficial landsliding has occurred at the site, and rocks dip steeply to the west. Groundwater levels are variable. In August 2003, the groundwater surface was at elevation +86 m (15 m below the dirt road) at Abutment 1-R. Groundwater measurements taken between August 2002 and August 2003 show the depth to the groundwater surface may vary by as much as a meter.

FOUNDATION RECOMMENDATIONS

The following recommendations are based on sketches faxed to me by Kevin Harper on February 27, 2004. Because of surficial landsliding present in this area, we recommend that the retaining wall be supported by 600 mm CIDH piles. Pile data are shown in Table 1. A Type 1 wall is currently proposed; no changes in these data are expected if a Type 5 or 7 wall (which would require a smaller footprint) is used instead.

MR. KEVIN HARPER
March 10, 2004
Page 2

Devil's Slide Bridge L/R
Br: 35-0331
Abutment 1R Ret. Wall

Table 1. Retaining Wall 600 mm CIDH piles.

Location (approximate) Sta. RW LOL	Design Load (kN)	Nominal Load (kN)	Pile Cap Elevation (m) (2)	Design Tip Elevation (m) (1)	Specified Tip Elevation (m)
10+00 - 14+88 (H=6700 mm)	400	800	+96.2	+91.2	+91.2
14+88 - 19+76 (H=6100 mm)	400	800	+96.2	+91.2	+91.2
19+76 - 24+64 (H=4800 mm)	400	800	+96.2	+91.2	+91.2
24+64 - 31+00 (H=3000 mm)	400	800	+95.8	+90.8	+90.8

NOTES

- (1) Compression tip, no tensile demands
- (2) Bottom of pile cap to be at or below this elevation.

CONSTRUCTION CONSIDERATIONS

Difficult pile installation is expected, due to steeply dipping rocks that vary in hardness from very soft to very hard. The steep dips will make drilling and maintaining a vertical hole difficult.

Because of potential for slope failure due to adversely dipping bedding, shoring or other methods of maintaining slope stability (e.g., rock bolts, soil nails, etc.) may be necessary.

If there are any questions, please contact Martha Merriam at (916) 227-7221.

c: Mildred Macaranas
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